

**FENDEROMYIA SHAW, A VALID NORTH AMERICAN TAXON IN
MACROCERINAE (DIPTERA: MYCETOPHILOIDEA: KEROPLATIDAE)**

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Abstract.—The North American genus *Fenderomyia* Shaw, 1948, was long believed to be a junior synonym of *Macrocera* Meigen, based on an artifact in thorax pleura and several plesiomorphic states of characters. Identification of a specimen of the type species, *F. smithi* Shaw, shows that the thoracic structure described by Shaw was not an artifact, and makes it possible to point out several peculiar morphological characters of the taxon. A phylogenetic analysis shows that these characters are autapomorphic and justifies the resurrection of *Fenderomyia*. The genus is also present in the Neotropical Region.

Key Words: Macrocerinae, *Fenderomyia*, valid generic status, morphology, character analysis

The genus *Fenderomyia* was erected by Shaw (1948) for a new North American species, *F. smithi*, allied to *Macrocera* Meigen, but which differed from this genus by the following characters: base of median vein distinct and reaching to the “m-cu” crossvein, costa produced far beyond apex of wing, and mesepimeron not reaching the metapleuron.

Coher (1963) rightly pointed out that the venation characters cited by Shaw for his new genus occurred also in several species of *Macrocera*. He added that Shaw's interpretation of the pleural sclerites was erroneous, based on “a variable condition shown by a series of *M. brunnea* Brunetti, 1912, to be a result of distortion during drying rather than of actual structure”. Accordingly, Coher considered *Fenderomyia* a junior synonym of *Macrocera*.

Laffoon (1965) recognized *Fenderomyia* as a valid genus, but it is doubtful that he knew of Coher's paper before the completion of his manuscript for the North American Catalog, which includes only “some

1963 names”. Thompson (1975), discussing the pleural morphology of *Lygistorrhina*, mentions the synonymy established by Coher, and Vockeroth (1981) does not include *Fenderomyia* in his key to the genera of Nearctic Mycetophilidae, which means that he also accepts Coher's synonymy.

Matile (1990), revising the generic classification of Macrocerinae, discussed the status of *Fenderomyia* and generally agreed with Coher, noted that all three venation characters were plesiomorphic for the group, and accepted the thoracic distortion explanation.

In some unsorted material of Macrocerinae at the National Museum of Natural History, Smithsonian Institution (USNM), I identified a specimen belonging to Shaw's species. It was collected in Oregon (Coos Co., Charleston, VI. 1963, NLH. Krauss), as was Shaw's type-series. As a result of an examination of this specimen and comparison with the extensive collection of Kero-platidae available to me, it is now possible to resurrect *Fenderomyia* from synonymy

on the basis of several morphological characters.

It is significant that the attribution to an artifact of an exceptional feature, the abridged mesepimeron, and the obviously plesiomorphic venation characters cited by Shaw for his new genus, have diverted the attention of all subsequent authors, the present one included, from the other very significant characters cited in the original description.

MATERIAL AND METHODS

The USNM specimen is a male (according to habitus) in rather poor condition: The antennae, most of the legs, and the tip of abdomen are broken (only the first five segments are present). It was originally glued laterally to a piece of cardboard. The integument of the thorax was slightly transparent, thus showing the thoracic muscles; the chitin of the pleura was smooth, without trace of infolding or outfolding, and the mesepimeron was definitely shortened. The specimen was detached from the cardboard and gently heated in distilled water, which demonstrated that the ventral margin of the mesepimeron corresponded to a true suture, with an internal phragma. One of Shaw's diagnostic characters of *Fenderomyia* was thus confirmed. The head was further boiled in KOH to check the absence of a membranous area between cerebral phragma and front or occiput, thus confirming its position in the Macrocerini rather than the Robsonomyiini. The specimen was then dried by the method of Sabrosky (1966), modified by the replacement of cellosolve by monoethylene glycol (Matile 1994), and then glued back to its cardboard. The head was preserved in glycerine in a microvial.

According to the original description, the type series of *F. smithi* should be in Shaw's collection, presently at the University of Massachusetts. Dr. T.M. Peters was unable to locate it either under *Macrocera* or *Fenderomyia*. Dr. R. J. Gagné was kind enough to make inquiries about the possible location of these specimens, but without suc-

cess, and writes "we will just have to assume that the types were never distributed to the intended institutions and are probably lost" (in litt. Apr. 1996).

CHARACTER ANALYSIS

Four characters, presumably apomorphic, can be added to the character of the shortened mesepimeron of *Fenderomyia*: the long stem of the anterior fork; the diagonal strip of dense, erect black setae of the metepisternite, briefly mentioned in the original description, which runs under the posterior spiracle and above the dorsal margin of the pleurite; the angular, short mediotergite, strongly projecting backwards behind the scutellum; and the presence of only one spur on all tibiae. I have examined these five features on about 100 species of *Macrocera*, described or undescribed, from all biogeographical regions, as well as in an extensive collection of other Keroplatidae and related families. The five characters are discussed below.

1. Mesepimeron.—The evolution of the mesepimeron has been discussed in Matile (1990: 378, 411), and outgroup comparison has shown that the most primitive condition in most Nematocera was a vertical plate reaching the lower margin of the pleura at the level of the metepisternite. In the Mycetophiloidea, the plate narrows ventrally, and the disappearance of its ventral part is undoubtedly apomorphic. The phenomenon has occurred several times in the Keroplatidae—at least twice in the Macrocerinae, e.g. in *Vockerothia* Matile (Macrocerini) and *Micrepimera* Matile and an undescribed genus in Robsonomyiini—and once in the Keroplatinae, namely in *Nauarchia* Matile (Keroplatini). It is also a trait of all Lygistorrhinidae and most Ditomyiidae.

2. Stem of anterior fork.—As regards the stem of the media in the studied species of *Macrocera*, the anterior fork always opens far basad of the base of R_5 , except in two Neotropical species, *M. guyanasi* Lane and *M. unidens* Edwards. Among the other Macrocerinae, a long stem as in *Fendero-*

myia is present only in a group of Australasian *Paramacrocera* Edwards, and in the Oriental genus *Micrepimera* Matile. In my character analysis of the anterior fork of the Mycetophiloidea (Matile 1990: 438), I noted that fossil evidence was in favor of the plesiomorphy of a long petiole, and inferred that its shortness in the Keroplatidae was apomorphic, and part of their groundplan. The condition of *Fenderomyia*, *Micrepimera*, the two South American *Macrocera* and the Australasian *Paramacrocera* should thus be a reversal, and its appearance in at least four groups of Macrocerinae the result of parallelism.

3. Postspiracular setae.—There is often in Keroplatidae a sparse patch of short setae at the posterior or ventral margin of the metepisternite, but the dorsal rows of dense setae in *F. smithi* do not really stand on the metepisternite, but above it, on the perispiracular membrane, a few of the ventral setae extending to the extreme dorsal margin of the sclerite (Figs 1a, b). These setae should in fact properly be named infraspicular setae. I have been unable to find this feature in any Macrocerinae, in Arachnocampinae and Keroplatinae (Keroplatini). I have checked also representatives of almost all the described genera of Orfeliini and have found this character absent also. It does not exist in the more primitive family Ditomyiidae, nor in the presumed sister-group of the Keroplatidae, the Diadocidiidae (for a provisional phylogenetic analysis of the relationships of the families of Mycetophiloidea, see Matile 1990: 383—386). The apomorphic state of the character seems therefore well founded.

4. Mediotergite.—In most *Macrocera* known to me, the mediotergite is high, subvertical in its upper half, then curves gently downward and forward to meet the metanotum, thus not projecting behind the scutellum, or very slightly so. In a few species, the sclerite is evenly rounded and projects somewhat behind the scutellum, the condition illustrated by Shaw for *M. formosa* Loew, but never in such proportions as in

Fenderomyia (Fig. 1a; compare also Shaw's Figs. 1 and 2).

The evolution of the mediotergite has been studied (Matile 1990: 405), and out-group comparison has shown that its primitive condition in Mycetophiloidea was a vertical, high and slightly rounded sclerite. In fact, this character is one of the nine used to separate Macrocerini and Robsonomyiini, the two tribes of Macrocerinae. Within the subfamily, the projecting mediotergite was considered autapomorphic for the Robsonomyiini. The condition of *Fenderomyia* thus must have appeared independently once in Macrocerini.

5. Tibial spurs.—Only one tibia and three tarsomeres, as well as some isolated tarsomeres, remained on the piece of cardboard of the USNM specimen and these became detached as the glue dissolved; the absence of a sensorial crypt indicates that the remaining tibia belongs to leg II or III; it has only one very short spur. Shaw states "tibia with one spur", and he had three specimens available, therefore I assume that his observation refers also to both the median and posterior legs.

The loss of the outer spurs II—III is an evolutionary trend of the Keroplatidae (Matile 1990: 418) which occurred independently once in the Keroplatinae Keroplatini (*Xenokeroptatus* Matile), and several times in the Orfeliini, but the state of this character was not known up to now in the Macrocerinae, although the reduction in size is common. Most *Macrocera* known to me have two posterior spurs, the longest about twice as long as the width of the tibia at its apex. Occasionally, the spurs are reduced to one tibial width, or a little less. Only in *M. guayanasi* and *M. unidens* are there two very minute spurs as observed on the Argentinian *Fenderomyia* mentioned below.

DISCUSSION

The validity of *Fenderomyia* is supported by five strong apomorphies. The short median fork is shared by two species of *Macrocera* (both with a rather shortened medi-

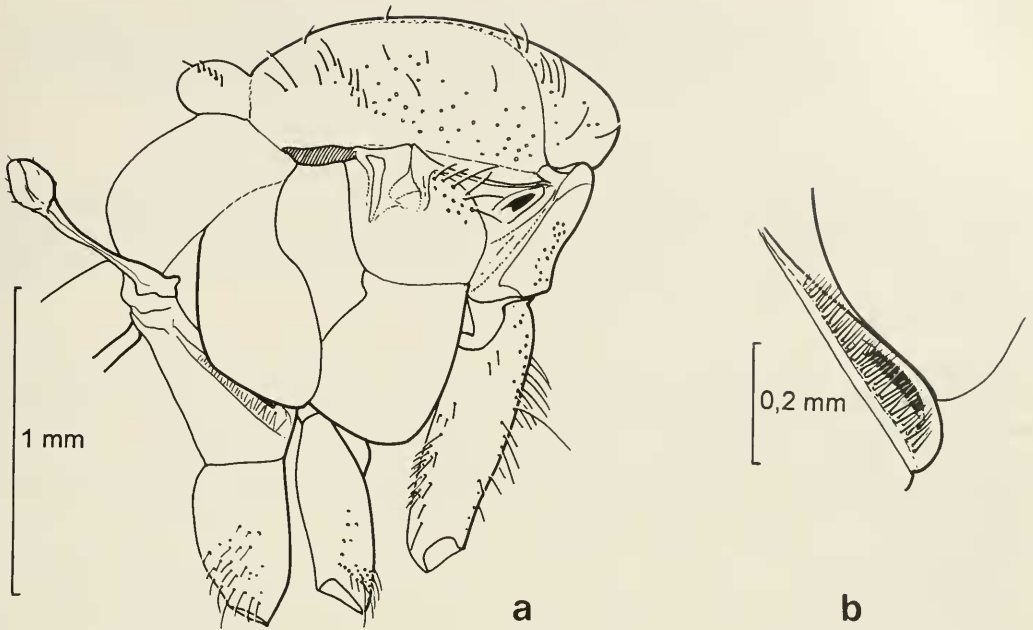


Fig. 1. *Fenderomyia smithi* (USNM specimen). a, Lateral view of thorax and coxae. b, Posterior spiracle and infraspicular setae.

otergite), and does not exist elsewhere in the subfamily. The thoracic structure has appeared several times in the subfamily, but never in *Macrocera*. The projecting, shortened mediotergite is unique for the Macrocerini, while it is characteristic of the Robsonomyiini. The loss of the external tibial spurs II–III is not yet known to happen in the Macrocerinae. Lastly, the infraspicular rows of setae are unique in the family Keroplatidae and its closest relatives. This amply justifies the acceptance of *Fenderomyia* as a valid taxon, if only to emphasise this peculiar set of apomorphies.

In the Duret Collection of Neotropical Mycetophiloidea, now preserved in the Muséum national d'Histoire naturelle, Paris, I found an unidentified female of "*Macrocera*" (Argentina, Salta, Campo Quijuano) which shares with *F. smithi* the disappearance of the ventral part of the mesepimeron, the long stem of the median fork and the projecting mediotergite, but lacks the dorsal row of infraspicular setae. Sc_2 is definitely absent, but the basal fold of the media is

very faint. The two anterior legs and one posterior leg are left; there is a short spur on tibia I, and two very minute spurs on the III, smaller than the basal diameter of the protarsus. I am reluctant to describe formally the species from a unique female, but the specimen certainly represents the closest known relative of *F. smithi*. Therefore, the infraspicular setae would be autapomorphic for *F. smithi*.

Provisionally, pending a revision of *Macrocera*, I propose to follow Shaw and to recognize *Fenderomyia* as a valid genus close to *Macrocera*, with the following diagnosis:

Fenderomyia Shaw, 1948: 94. Type species: *Fenderomyia smithi* Shaw, 1948: 94 (original designation).

A genus close to *Macrocera*, sharing with this genus the globular antennal scape and the long flagellum, but differing in the incomplete mesepimeron, interrupted at the level of lower third of the laterotergite, the

projecting mediotergite, the stem of the medial fork long, ending at level of the base of R_5 . In the type species, posterior spiracle with several rows of posterior setae and only one tibial spur II–III. In the Neotropical species, spiracular setae absent, and hind tibia with two minute spurs.

Additional characters of taxonomic or phylogenetic significance in *Macrocera* or *Macrocerini* are: Cerebral sclerite large, meeting the eyes at their anterior corner, bearing long anterior setae. Thorax and coxae as in Fig. 1a, acrostichal bristles absent. Scutellum with short, fine marginal bristles. Mesanepisternite with long, erect, dorsal setae. Subscutellar membranous area narrow. Wing: C strongly produced after R_5 , Sc_2 visible as a trace (USNM specimen) or absent, basal fold of the media very strong (*F. smithi*) or faint (Neotropical species). Anal vein long, reaching to the margin. Wing membrane without macrotrichiae. Ciliation of veins, dorsal surface: C, R_5 , branches of the anterior fork, M_4 , Cu_{1b} and tip of anal vein. Male genitalia simple, of the *Macrocera* type (Shaw, 1948: fig. 4).

Distribution: Nearctic and Neotropical.

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LITERATURE CITED

- Coher, E. I. 1963. Asian *Macrocera* Meigen, 1803, (Diptera: Mycetophilidae), with some remarks on the status of the genus and related genera. Bulletin of the Brooklyn Entomological Society 58(1): 23–36.
- Laffoon, J. L. 1965. Family Mycetophilidae (Fungivoridae), pp. 196–229. In Stone, A. et al., eds., A Catalog of the Diptera of America north of Mexico. U.S. Department of Agriculture, Agricultural Handbook 276, iv + 1–1696.
- Matile, L. 1990. Recherches sur la systématique et l'évolution des *Keroplastidae* (Diptera, Mycetophilidae). Mémoires du Muséum national d'Histoire naturelle, sér. A, Zoologie 148: 1–682.
- . 1994. Les Diptères d'Europe occidentale. I. Introduction, Techniques d'étude et Morphologie. Nématocères, Brachycères Orthorrhaphes et Aschizes. Paris, Boubée, 439 pp.
- Sabrosky, C. W. 1966. Mounting Insects from Alcohol. Bulletin of the Entomological Society of America 12(3): 349.
- Shaw, F. R. 1948. A new genus and species of fungusgnats (Mycetophilidae). Bulletin of the Brooklyn Entomological Society 43(3): 94–96.
- Thompson, F. C. 1975. Notes on the genus *Lygistorrhina* Skuse with the description of the first Nearctic species (Diptera: Mycetophiloidea). Proceedings of the Entomological Society of Washington 77(4): 434–445.
- Vockeroth, J. R. 1981. 14. Mycetophilidae, pp. 223–246. In McAlpine, J. F., ed., Manual of Nearctic Diptera. Volume 1. Biosystematics Research Centre, Research Branch, Agriculture Canada. Monograph No. 28. Ottawa, vi + 674 pp.